

"He's Not Really a Reader...": Perspectives on Supporting Literacy Development in Individuals with Autism

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Although many individuals with autism are able to demonstrate skills that are directly related to literacy, they are often seen as "too cognitively impaired" or "not ready for" instruction in this important area. This article provides suggestions for strategies that can be used to promote literacy learning across the five stages of word reading development described by Ehri. Examples of the experiences of people with autism who have become successful readers are included to illustrate the importance of promoting literacy development for all learners. Key words: *augmentative and alternative communication, autism, literacy*

"Why is Stanley sitting over there stacking blocks instead of listening to the story?" I asked. This was my second visit to Stanley's kindergarten, and I was still trying to understand the classroom expectations and rules. "Oh, he can't sit still during story time and he doesn't seem to understand the stories, anyway," his teacher replied. "We decided he would benefit more from one-on-one instruction to improve his fine motor skills." "But I just saw him yesterday looking at a book about fire trucks for more than 10 minutes at recess. He seemed really interested in that," I countered. "Oh, well, yes, he has this thing about truck books, but all he really does is 'stim' on the pictures. We try to discourage him from that," she explained. "He's not really a reader."

Stanley has a problem. His problem is not the fact that he has been labeled as having autism, nor is it the fact that he has not yet developed more than 10 words of speech. His problem is

not even that he can't yet read or write. Stanley's problem is much more fundamental—it is that his interest in truck books is seen as "stimming" and is discounted because he's "not...a reader." Because, even at the tender age of 6, Stanley is not expected to learn to read, write, spell, or become otherwise literate, he probably will not.

THE READINESS MODEL OF LITERACY INSTRUCTION

Unfortunately, Stanley's story is not unusual. Despite the fact that many individuals with autism are able to demonstrate skills that are directly related to literacy such as print awareness and the ability to recognize common sight words, they are often seen as "too cognitively impaired" or "not ready for" instruction in this important area. At least in part, this is due to the fact that outdated theories and research regarding literacy development in typical populations have guided literacy instructional practices for individuals with autism for many years. The "readiness model" of literacy instruction had a great impact on the nature of instruction provided to these students, who often have difficulty acquiring the numerous prerequisite skills deemed essential for literacy develop-

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ment (Conners, 1992; Erickson & Koppenhaver, 1995; Kliever & Biklen, 2001). For example, many students with autism spend considerable instructional time trying to master phonics, the ability to recognize letter-sound relationships, which is considered by some to be an essential prerequisite skill for reading. However, the decontextualized nature of traditional phonics instruction makes it almost impossible for many of them to demonstrate mastery of the subskills in this area. Students without functional speech who require augmentative and alternative communication (AAC) are at especially high risk for failure in readiness-based literacy programs because of the supposition that reading is impossible in the absence of the ability to sound out words phonetically. For them, the readiness approach to literacy instruction "only serves to highlight [their] disabilities and emphasize differences in each student's performance from that of the mainstream population" (Ryndak, Morrison, & Sommerstein, 1999, p. 5). Those who prove themselves to be unable to master the "necessary" prerequisite skills are thus considered ineligible for further literacy instruction.

Hyperlexia

At the other end of the "prerequisite continuum" are students with autism and hyperlexia. Specific characteristics of hyperlexia include: (1) word reading skills that exceed what would be predicted or expected, based on their cognitive and language scores on standardized tests; (2) compulsive or indiscriminate reading of words; (3) onset of these abilities when the child is 2–5 years old; (4) onset of these abilities in the absence of direct instruction; and (5) a discrepancy between reading comprehension and word reading abilities (Cobrinik, 1974; Silberberg & Silberberg, 1967). Implicit in this definition is that hyperlexia only occurs in individuals who can speak, because, without speech, it would be virtually impossible to know that a person has word reading skills that meet the criteria. Students with hyperlexia usually *excel* in traditional phonics instruction because the ability to decode is linked to visual-spatial skills, the application of phonological rules, and the detection of patterns in words (Cunningham, 1992)—all of

which are areas of strength for many individuals with autism. Unfortunately, even students with autism and hyperlexia are often discounted as potential readers because their unusual decoding abilities are seen as mere "splinter skills" that have no real merit. However, research evidence suggests that the comprehension deficit in hyperlexia stems from a problem with general receptive language comprehension rather than from a problem with reading comprehension *per se*. Thus, in terms of reading, children with autism and hyperlexia may not be dramatically different from their peers without disabilities. All readers require background knowledge and general language understanding to comprehend text. Even the very best readers encounter texts that can be decoded but not comprehended because of the complexity or unfamiliarity of the topic. Thus students with autism and hyperlexia should not be viewed as incapable of learning to comprehend what they read, nor should they be expected to comprehend all of the words they can decode.

FUNCTIONAL READING INSTRUCTION

In the 1970s and 1980s, a "functional" or "sight word recognition" approach to literacy instruction became popular for students with autism, in part because of research evidence that at least some of these individuals could learn to associate printed words with their referents (e.g., Hewett, 1964; LaVigna, 1977; Marshall & Hegrenes, 1972; Ratusnik & Ratusnik, 1974). Kliever and Biklen (2001) noted that this approach also leaves many individuals behind on the "ladder of literacy" as they are "steered to...ladders with fewer rungs, which lead to functional or life skills reading and writing, if [they are] allowed to engage the printed word at all. Literacy as a process of critical thinking, interaction, or abstract communication is never considered" (Kliever & Biklen, 2001, p. 2). In the context of functional skills instruction, students frequently are taught to recognize sight words (e.g., "enter," "exit," "men," "women," "danger") that are considered essential for them to be independent in community settings. However, letters and words are rarely considered as

viable communication options for individuals with autism because, although many are able to learn at least some sight words quite readily, they often fail to generalize this ability to non-instructional settings (Browder & Xin, 1998). In the end, the functional curriculum model—as with its predecessor, the readiness model—also serves to prevent many students from acquiring literacy skills, and thus reinforces the belief that they are unable to become readers and writers.

FACILITATED COMMUNICATION

In the 1990s, the introduction of facilitated communication (FC) in North America as a potential communication technique for people who are unable to speak created renewed interest in the literacy learning potential of persons with autism in particular. FC involves the use of a letter board or keyboard (e.g., printed alphabet letters on a piece of cardboard, a small portable typing device) on which messages are typed on a letter-by-letter basis. The typist's forearm, wrist, and, if necessary, index finger are physically supported by a "facilitator," who provides emotional, physical, and instructional support (Biklen, 1990). Gradually, the supports provided by the facilitator are faded, with the goal of independent typing.

FC was and still is a very controversial technique because it is often difficult to determine whether the typist or the facilitator is actually doing the typing. The controversy emerged largely because of the unexpected quantity and quality of the messages produced by many facilitated typists who had never received literacy instruction and were presumed to be unable to read or write. Numerous books, chapters, articles, and dissertations have attempted to

answer the authorship question through various research approaches (e.g., Biklen, 1993; Biklen & Cardinal, 1997; Shane, 1994). The vast majority of this research has indicated that facilitated typists are easily influenced by their facilitators in typing messages (e.g., Eberlin, McConnachie, Ibel, & Volpe, 1993; Moore, Donovan, & Hudson, 1993; for a complete discussion see Green & Shane, 1994). However, a few studies have also found that some typists appear to be able to compose messages without facilitator influence (Cardinal, Hanson, & Wakeham, 1996; Sheehan & Matuoizzi, 1996; Weiss, Wagner, & Bauman, 1996).

Today, there is a growing number of individuals in North America and elsewhere who once relied on facilitation (i.e., physical support of the hand or arm and emotional support) to type but are now independent typists (e.g., Blackman, 1999) or even functional speakers (e.g., Broderick & Kasa-Hendricksón, 2001). In 1998, Sue Rubin, a young woman with autism who used FC for many years before she began to type independently, wrote that, "Before I began to type, I did not think.... What was amazing was that no one had taught me how to read or spell, but I was able to do both.... I believe I picked up this information from the environment and stored it away. It was only after I started typing that the information was accessible" (p. 5). For Sue Rubin and others, FC apparently served as a bridge to literacy and enabled them either to access skills they had already developed but were unable to demonstrate, or to develop new skills related to reading, writing, and spelling. The experiences of these individuals suggest at least two hypotheses (Crossley, 1993):

1. Some individuals with autism who cannot speak or write can learn to read and spell. Speech is not a prerequisite to literacy; and
2. Literacy may be acquired from print exposure or from formal teaching.

Of course, neither of these hypotheses is novel when one considers the experiences of many individuals who are unable to speak or write because of severe motor impairments such as cerebral palsy. Many of these individuals also learn to read and write in the absence of formal instruction or literacy-rich environments. The

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difference, of course, is that we "know" that many people with severe motor impairments have no cognitive impairments, so we can "make sense of" their self-taught literacy skills as the products of underestimated but intact intellects. What surprises us about literacy development in virtually all of the ex-FC users who now type independently is that literacy seemed impossible for them because they were all considered to have significant cognitive impairments. In 1997, Sharisa Kochmeister, who at one time had a measured IQ in the range of "profound" mental retardation, wrote:

I spent in excess of 11 years (ages 1 to 13+) with no way to communicate because I was and still am, almost completely non-verbal.... Although I readily understand spoken and written language.... I couldn't speak, or use sign language effectively.... People fully believed I was "hopelessly retarded" since I couldn't express myself or respond well. When I started to type, I needed my hand held and index finger supported. Over time, I moved to wrist support, elbow support, a hand on my shoulder, and just having someone's hand "shadowing" mine. All these kinds of "facilitation" made it easier to overcome my inertia; but they also caused people to question whether it was my hand or that of my "facilitator" actually typing. I finally became an independent typist because of those doubts that became the ultimate motivator... (p. 10).

Kochmeister's journey up the literacy ladder was accomplished despite an almost complete lack of formal literacy instruction because of assumptions that were made regarding her competence (or, more accurately, the lack thereof). It would be easy to dismiss her story as unique if it was not echoed by the experiences of others who were also facilitated at one time and now type independently, such as Sue Rubin and Lucy Blackman. Blackman (1999) described how she acquired the ability to read before she went to school:

Although I was not able to make my first total sentence till my teens, and that on a keyboard, the safe and coherent language of the written word was with me from an early age. This started as the other girls [her sisters] brought home simple reading from schools. I must have been very young because I think I could understand some of the words in Jenny's [one of her sisters] very first reader, and she started school when I was two and a half.

A picture of a ball and the four letters that were below it came together in a completely synchronized way, but I know that until I was a lot older I never connected those symbols with the huggable plastic sphere I could hold in my hands. I never developed the urge to follow a written or symbolic instruction, and I never became automatic at speaking a written word. So no one knew I could read. At that stage I would not have seen any point in showing that I could. (p. 46)

As noted previously, it is generally assumed that hyperlexic reading abilities occur only in individuals who are able to decode words and speak them out loud. However, this anecdote suggests that, despite her inability to speak, Blackman met many of the criteria for hyperlexia: her reading abilities developed spontaneously (i.e., without instruction) at a young age, exceeded what would have been predicted by her language scores on standardized tests, and involved a discrepancy between word recognition and the "connection of [printed] symbols" with the objects they represent. One of the more provocative questions raised by Blackman's anecdote is: How many other individuals with autism who cannot speak are also hyperlexic—or conventionally literate—and have no way of demonstrating this ability? Or, somewhat less controversial: How many people with autism *might* be able to learn to read and write, but are never given the necessary instructional and other supports to do so (Kliewer & Biklen, 2001)? These questions, borne largely from the FC experience, have served as the impetus for a more balanced approach to literacy development for persons with autism, as discussed in the next section.

A BALANCED APPROACH TO LITERACY

Most recently, the instructional pendulum has swung again, this time toward practices supported by balanced literacy theories, the use of a wide range of technologies, and the belief that students with autism and other developmental disabilities can, indeed, participate meaningfully in literacy learning experiences alongside their typical peers (Kliewer & Biklen, 2001; Koppenhaver, 2000; Mirenda & Erickson, 2000). Recent

research regarding literacy learning in typical children has challenged the notion that reading and writing are primarily the result of an accumulation of subskills (Au, 1998; Cunningham, Hall, & Defee, 1991, 1998; IRA & NAEYC, 1998; Kantor, Miller, & Fernie, 1992; Pressley, Wharton-McDonald, Allington, Block, & Morrow, 1998). Instead, literacy is now viewed as an interactive process that encompasses the use of listening, speaking, reading, and writing related to everyday life (Teale & Sulzby, 1986). These four components of literacy are believed to "...interrelate and develop both simultaneously and interactively" (Ryndak et al., 1999, p. 5). Thus literacy is not seen as a unitary behavior that can be defined simply in terms of the number of words a person can read or spell correctly. Reading in particular is seen as a complex, interactive process that involves attention, memory, metacognition, motivation, and strategic action. Reading is not simply decoding, and comprehension of individual sight words does not by itself guarantee understanding at the level of sentences or paragraphs. Text comprehension requires readers to attend to word meanings and to both activate and apply background knowledge and experiences (i.e., schema) to text information for understanding (Anderson, 1977; Rumelhart & Ortony, 1977). However, prior knowledge alone is also insufficient. Comprehension also requires that readers use metacognition (i.e., awareness of one's own thinking) and strategies for reading and learning to understand text (Baker & Brown, 1984). Similarly, motivation plays an important role in reading comprehension. In short, readers need both skill and will to be successful comprehenders.

How is this best accomplished? Recent research concerning the factors related to successful literacy learning suggests that learners with and without disabilities may be more similar than previously thought (Cunningham et al.,

1991, 1998; Koppenhaver, Evans, & Yoder, 1991; Koppenhaver, Pierce, Steelman, & Yoder, 1995). Home environments that are rich in communication, that support children to develop effective and efficient communication skills, that provide access to print materials, and that include models of functional literacy use appear to facilitate early literacy learning in all children (Erickson & Koppenhaver, 1995; Koppenhaver et al., 1995; Marvin & Mirenda, 1993; Ryndak et al., 1999). The expectations of parents and teachers are also extremely influential, especially for students with disabilities (Erickson & Koppenhaver, 1997; Kliever & Biklen, 2002; Koppenhaver et al., 1991; Ryndak et al., 1999). Given that "language and literacy are simultaneously learned and a mutually beneficial process" (Koppenhaver et al., 1995, p. 265), a literacy learning environment that is rich in meaningful communication opportunities is also essential for students across the ability range.

It is increasingly clear that most—if not all—students with autism can benefit from literacy instruction that incorporates the use of multiple instructional strategies that are carefully matched to the stages or phases of development through which all readers pass on their way from emergent reading to skilled reading. Ehri and McCormick (1998) noted that information about the stages of literacy development is important, to help teachers "understand and interpret the word reading behaviors they see in delayed or disabled readers. Behaviors that might be regarded as bizarre, atypical reactions to print are in most cases just behaviors that typify less mature readers who are at an earlier phase of development" (p. 136). They described four ways by which words can be read by skilled readers: (1) *decoding*, which involves identifying the sounds of individual letters and then blending them into pronunciations of words; (2) *analogy*, which involves recognizing how the spelling of an unfamiliar word is similar to that of a familiar word and then adjusting the pronunciation according (e.g., reading "sunny" by analogy to "funny"); (3) *prediction*, which involves guessing new words using initial letters, context cues such as pictures, and/or nearby text; and (4) *sight*, which involves using memory to read words that have been encountered in print

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before. Literacy instruction that encourages students to use all four of these strategies for reading new words as they progress across Ehri's (1991, 1994, 1995) five phases of word reading development is essential. These phases are described briefly in the sections that follow, with examples related to students with autism.

PREALPHABETIC PHASE

In this first phase, alphabetic knowledge is not used to read words because students have very limited knowledge of letters and do not understand grapheme-phoneme relationships (i.e., that letters in written words map onto sounds in spoken language). Thus sight word reading predominates at this phase, as often experienced by parents of even young children who are able to recognize familiar words such as McDonald's, Coca-Cola, or STOP. Like typically developing children, those with autism are often quite adept at "reading the environment" in this way, especially when pictures or logos (e.g., the "golden arches") accompany the words. Even individuals whose speech has not developed often react affectively to the sight of familiar words and are able to demonstrate recognition of them when asked to do so. The importance of sight word recognition skills should never be underestimated or discounted, because they form the foundation upon which other, more complex skills can be built. Acknowledgment of the importance of this skill was articulated eloquently in the following excerpt in which Russell Martin described his nephew Ian, a kindergarten-aged child with autism who was unable to speak:

...[W]hen presented with cards that read *goat* and *duck*, or even *car* and *cat*, he could point to the proper word when requested to do so. His facility with these skills surpassed the majority of his kindergarten peers, and by the measure of most every scholastic indicator only one conclusion could be drawn: Ian, like an ordinarily wondrous five-year-old, was on the verge of reading.... Apart from the voice his [augmentative communication device] gave him, he could still express almost nothing, but imagine what would come his way if ever he truly could read!.... If Ian could read the printed words and stories that captured his interest as well as understand what was spoken to him,

then even absent speech, surely he would live a life alive with language. (Martin, 1994, p. 150)

Although the use of pictures or picture symbols to teach sight word recognition is often helpful during this stage, it is important to note that simply pairing pictures and words is unlikely to be sufficient, since familiar pictures appear to block learners' attention to unknown print stimuli (Singh & Solman, 1990; Solman & Singh, 1992). However, in a recent study, Fossett (2003) compared paired associate instruction, in which pictures and words were presented simultaneously, with picture-word matching instruction, in which learners were engaged in activities that required active manipulation of words associated with pictures. For two out of three participants with developmental disabilities and a history of reading failure, the picture-word matching condition resulted in sight word learning whereas the paired associate condition did not; the third participant failed to acquire sight words in either condition. Thus it appears that initial sight word instruction should include activities that require picture-word matching or some other technique (e.g., picture fading) (Dorri & Zeaman, 1975; Tabe & Jackson, 1989) that has been shown to be successful in overcoming the blocking effect.

In addition, instruction at the prealphabetic stage should focus on teaching students to become alphabetic readers by acquiring both letter knowledge and phonemic awareness through games and other contextual instructional activities that support, scaffold, and guide the discovery of letter-sound relationships (Ball & Blachman, 1991; Cunningham & Allington, 1999; Griffith & Olson, 1992). Students with autism who are unable to speak can engage in such activities through the use of software programs such as All My Words (Crick Software, Ltd.) and the Teach Me Phonemics series (Soft-Touch). Computers that provide speech output may also be useful to support the development of phonemic awareness (Heimann, Nelson, Tjus, & Gillberg, 1995; Schlosser, Blischak, Belfiore, Bartley, & Barnett, 1998). Software applications such as Picture It, PixWriter, and PixReader (Slater Software, Inc.) and Writing with Symbols 2000 (Mayer Johnson Co.) can be

used to support students' transition from reading pictures to reading print. Armed with this knowledge, students will be equipped to move to the partial alphabetic phase of reading.

PARTIAL ALPHABETIC PHASE

In this phase, decoding skills and skills for reading by analogy are beginning to develop but are still weak. Mason (1980) referred to this as a "visual recognition" stage because students begin to detect letters in words and can begin to guess the meanings of unfamiliar words from their contexts. For example, a student may look at a picture of a birthday party with a word beginning with a *c* printed below it, and may be able to guess that the word is cake. Readers at this phase typically know the sounds and names of "easy" consonants (e.g., *d, f, p, m*) but not of graphemes (e.g., *sh, ch, th*) or letters whose names are not directly related to their sounds (e.g., *h, w, y*). However, it is important to note that students with autism—particularly those whose understanding of language surpasses their ability to speak—may have difficulty demonstrating their knowledge of phonics in conventional ways. Temple Grandin, who has written extensively about her experiences as a child with autism, recalled an episode that occurred for her at age 5:

After drilling us on the different sounds of letters, Mrs. Clark [her teacher] gave each of us workbooks with pictures. On one page there was a box, a suitcase, a bird bath, a chair, a telephone, and a bicycle. Mrs. Clark said, "Mark the pictures that begin with 'b'." I marked the suitcase because I thought it was a box. I skipped the picture of the bird and bird bath. They were in the middle of a garden and I thought 'g' was the key sound for them. But I couldn't speak well enough to explain to Mrs. Clark why I had or had not marked certain pictures. I understood the concept of the 'b' sound, and I had a logical reason for every mark I made. Frustration raged within me and I wanted to hit or kick to release the feeling.... Even if I could have explained my thinking to Mrs. Clark, she couldn't have accepted my logic—my reasoning didn't fit into the black or white, right or wrong method of teaching. (Grandin & Scariano, 1986, pp. 29–30)

In contrast to Grandin's experience, Ehri and McCormick (1998) noted the importance of engaging partial alphabetic readers in motivating phonics activities that incorporate games and manipulatives (e.g., magnetic letters), and warned that it is "unrealistic" to expect students in this phase to demonstrate mastery of phonics, because their knowledge of grapheme-phoneme relations is still insufficient. They also stressed the importance of writing activities that allow and even encourage invented spellings (e.g., *pza* for pizza, *fon* for phone), using computers, Magic Slates, chalkboards, and other media. Teachers can then interact constructively with students about their invented spellings to encourage more conventional forms. Students whose handwriting is insufficient for writing can benefit from the use of computer software programs such as Clicker 4 (Crick Software, Ltd.) and Write: OutLoud (Don Johnston, Inc.), a simple word processing program that reads words aloud as students write. Inexpensive, portable keyboards such as the AlphaSmart 3000 (Don Johnston, Inc.) are also important for these students to prevent them from being "turned off" to writing simply because of difficulty with its execution. Phonics activities for students without speech can also be supported with a variety of contextually-relevant instructional techniques (Casey, 2000a, b; Detheridge & Dethridge, 1997; Musselwhite & King-DeBaun, 1997). Other goals during this phase include helping students build their sight word skills and prediction strategies to read very basic connected text (e.g., level 1–4 Reading Recovery Books, texts that correspond closely to pictures on each page, texts with few words or short phrases and sentences on each page).

FULL ALPHABETIC PHASE

By this phase, readers have acquired the "foundation for attaining mature reading skill in an alphabetic writing system" (Ehri & McCormick, 1998, p. 143). Although they may execute decoding operations quite slowly and laboriously, these students have a working knowledge of the major grapheme-phoneme correspondences and begin to read unfamiliar

words by analogy, "Read, read, read, read, read" should be the slogan of students in the full alphabetic phase, because it is only through sufficient reading that they will eventually become fluent decoders. Fortunately for those who support students with autism, repeated reading of familiar books is not only acceptable in this regard—it is actually encouraged to build fluency, as long as students do not rely on memory alone to read but also pay sufficient attention to the text. Activities that incorporate rhymes (bat, fat, cat, hat) and other strategies to build analogy skills are also important. Of course, decoding and reading by analogy should always be practiced in ways that build comprehension simultaneously; this is especially important for students with autism who can easily become "decoding junkies" in the absence of understanding. Clara Claiborne Park, the mother of "Elly" and author of *The Siege* (1967), described her concern about this issue when Elly was about 6 years old:

When it became clear that there was no upper limit on the number of word-cards I could teach Elly to recognize, I stopped adding new ones. Elly could not yet understand the story of the Three Bears when I read it to her; how could she read it herself? I did not want to see her "reading" degenerate into rote recognition; it was important that her words not outrun her comprehension.... So instead of increasing her recognition vocabulary, I started putting the words she already knew together in short sequences, pictures above word to make sure the symbols kept their meaning. "Elly...hurt finger red blood cry." I could put her through the sequence, but slowly, slowly...(p. 222)

Ehri and McCormick (1998) suggested that the texts most appropriate for students in this phase are those that they can read with accuracy levels above 95% and with comprehension levels at or above 75%. When word accuracy drops below 95%, most students find the reading task quite frustrating. This may require that stories and other material whose content is appropriate for older children be re-written in simplified form so that older, beginning readers can manage the text successfully. Prediction, reading by analogy, sight word recognition, and decoding should all be encouraged through the provision of balanced literacy activities that combine reading, writing, and listening in relevant contexts (e.g., Cunningham, Hall, & Sigmon, 1999).

Again, technology-based reading and writing supports are likely to be critical at this stage for students who are unable to speak (Fossett, Smith, & Mirenda, 2003; Mirenda & Erickson, 2000).

CONSOLIDATED ALPHABETIC PHASE

This phase has also been referred to as the "orthographic phase," because the emphasis is on teaching students to learn, recognize, and use common "chunks" of letters that recur in different words. These include prefixes (in-, on-, sub-), suffixes (-ed, -ing, -er), and other common spelling patterns (-at, -it, -ness, -tion). Students also begin to learn more complex decoding skills that involve "rules" about the influence of graphemes on one another in words (e.g., "i before e except after c," as in believe vs. receive; "e at the end makes a vowel long," as in fine vs. fin). Some students—especially those with autism who excel at decoding—are able to acquire these skills automatically, although most benefit from explicit instruction as well. In addition, students' sight word vocabularies and skills for reading by analogy increase as they continue to read increasingly complex texts.

As noted previously, many students with autism experience fine motor difficulties that affect writing, and even those who manage to hand-write in earlier phases of literacy development may experience increasing frustration as writing demands increase in the later phases. In addition, producing accurate spelling can be quite challenging for many students—even those who can read fluently and with reasonable comprehension—as spelling "exceptions" become increasingly common in text. Writing and spelling can be just as much a concern for students with Asperger syndrome as for those with autism, as noted by Hans Asperger (1944) himself in his original description of children with the syndrome that now bears his name.

Fritz V

In his tense fist the pencil could not run smoothly. A whole page would suddenly become covered with big swirls, the exercise book would be drilled full

of holes, if not torn up. In the end it was possible to teach him to write only by making him trace letters and words which were written in red pencil.... However, his handwriting has so far been atrocious.... He was able to spell correctly when forced to be careful. However, he made the silliest mistakes when left to his own devices. (Asperger, 1944, p. 49)

Harro L

His handwriting...was very poor. He carried on writing carelessly and messily, crossing out words, lines going up and down, the slant changing.... As long as his attention was focused on a word, he knew how to spell it. (Asperger, 1944, p. 55)

Ernst K

His most blatant failure was in writing.... The pen did not obey him, it stuck and spluttered....he crossed out, and his letters varied in size. However, this was not the worst aspect of his writing. Even when copying—where he drew letter by letter with painful effort—he would make many spelling mistakes. (Asperger, 1944, p. 63)

Imagine how these descriptions might have changed if Fritz, Harro, and Ernst had had access to twenty-first century technologies such as Co:Writer 4000, a software program (Don Johnston, Inc.) that provides both writing and spelling assistance and can be customized as students' needs change over time! Such supports, when combined with "talking word processors" such as Write:OutLoud, are equally applicable to students who are unable to speak but who acquire more advanced literacy skills.

AUTOMATIC PHASE

The final phase of literacy development is the phase of proficient reading, spelling, and writing abilities. Automatic readers have a flexible set of both decoding and text comprehension strategies that can be employed when they encounter foreign words, so that a high degree of accuracy and understanding is maintained. Such readers typically enjoy reading and are quite willing to tackle unfamiliar texts on topics of interest. In fact, many students with autism in this phase read voraciously in areas of special interest, as

illustrated in this anecdote about a Swedish boy, age 6:

[H]e quickly learnt the letters of the alphabet and acquired some reading skills to the extent that he could amass new knowledge out of encyclopedias concerning frogs. Asked to read other texts, he refused.... He demands to go to the library every day to take down all the books with information about frogs from the shelves. (Gillberg, 1991, p. 133)

For this unnamed boy and for many of his peers—as for most people without autism—literacy is a key to the acquisition of new knowledge. For others, such as Sue Rubin and Sharisa Kochmeister whose experiences were described previously, the ability to read and write fluently provides a means to communicate. Rajarshi "Tito" Mukhopadhyay, an adolescent with autism from the Indian subcontinent whose primary mode of communication for many years has been independent writing and typing, described the day he was first able to write, in a poem entitled "My Memory":

I had to finally write my words and language. Mother had placed my communication board next to a page. She asked me to write the spelling of "cat."

I pointed at the letter c and I copied it.

Next I pointed at the letter a and I copied it.

Then I pointed at the letter t and I copied it.

That was the beginning and that was my passport to make people believe that my words are no one's but my own.... After that my mother was believed.

And after that I was believed.

Not only by my father and uncles at home, but by doctors and psychologists who love to provide that you are wrong and they are right (http://www.cureautismnow.org/tito/memories/my_memory.pdf, p. 22).

Finally, it is also interesting to note that, at least in some individuals with autism, advanced literacy skills and AAC appear to support the subsequent development of speech. For example, Jamie Burke is a teenager whose speech developed around the age of 12 after he typed for several years via facilitated communication. Now able to type independently most of the time using a portable keyboard called a Lightwriter

(Toby Churchill, Ltd.), Jamie described his perceptions of the relationship between his literacy skills and the emergence of his ability to talk:

My Lightwriter is a wonderful tool to help my brain figure out the connection between words sounding and meaning.... It's seeing and hearing together.... Exposure to the printed word is like water to the desert. Only books could lead the way to gain understanding how to say words. (Broderick & Kasa-Hendrickson, 2001, pp. 21-22)

Clearly, whether for the purpose of knowledge acquisition, communication, or speech development, the attainment of sophisticated literacy development is an important and worthy goal for individuals with autism both with and without speech.

CONCLUSION

So, what about Stanley, the child who was introduced at the beginning of this article? What basic advice should be provided to Stanley's teachers, parents, and others who are interested

in supporting him to develop in every possible way? First, of course, they should be encouraged *not* to discount his interest in books about trucks—instead, his interest should be channeled into activities that enable him to read, write, draw, and communicate about trucks, at least until his interest in this topic wanes and then shifts to another! Second, they should be reassured that teaching literacy to students such as Stanley who cannot speak is *not* a futile effort—it is an effort, however, that requires the use of specialized assessment and instructional techniques as well as technologies that support all aspects of literacy development. Third, they should be supported to be patient but persistent in assessing Stanley's current phase of literacy development and supporting him to both develop the skills that are typical of that phase as well as those that will allow him to advance to the next, and the next, and the next. And, finally, they should be reminded that supporting Stanley to learn to read, write, and spell is, indeed, a worthy endeavor—an endeavor that, at a minimum, will open up for him potentially new avenues for learning and that may lead to even more.

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COMPUTER SOFTWARE AND HARDWARE RESOURCES

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